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VOL. 62, NO. 11 PAGES 161-17

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Deadly Armament

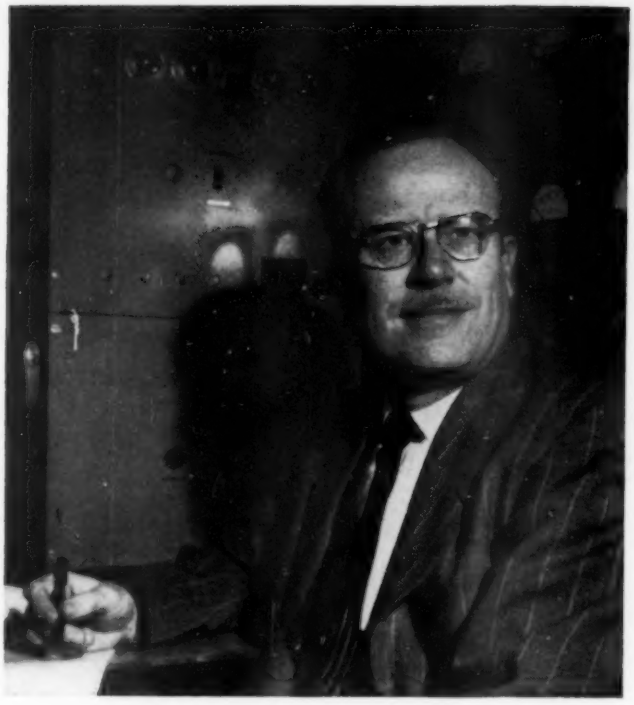
See Page 168

A SCIENCE SERVICE PUBLICATION

Adventurers in Research..

Dr. J. A. Hutcheson

SCIENTIST-ENGINEER



Director of the Westinghouse Research Laboratories. After graduation from the University of North Dakota in 1926, he came directly to the Westinghouse graduate student training course. In 1940 he was named Manager of the Radio Engineering Department, three years later Associate Director of the Research Laboratories, and in 1949 was appointed to the Director's post. In 1950 he became Vice-President.

In a conversation with Dr. J. A. Hutcheson about research, you will hear him express his guiding philosophy, "The more we know about a subject, the more intelligently we can deal with it". This philosophy probably explains why he is head of one of the world's largest industrial research laboratories—a position reached via engineering instead of test tubes.

Dr. Hutcheson's career was launched in radio engineering in the design of radio telephone and broadcast transmitters. He developed radio, radar and other electronic equipment that played a vital part in the successful completion of World War II.

Both during and after the war, Dr. Hutcheson was in intimate contact with the nuclear research program. He was one of the civilian observers at the postwar atomic tests at Bikini.

Dr. Hutcheson's outstanding ability to guide the work of others, in addition to his brilliant engineering and research record, made him ideally suited for the job of directing a large research institution. One might think that with a background predominantly engineering, he would emphasize applied rather than fundamental research. Such has not been the case. His years as a designer made him keenly aware of the limitations placed on the engineer by lack of fundamental knowledge.

An example illustrates this. Many devices involve the passage and extinction of current in gases. An enormous amount of research effort has been spent to improve switches, fuses and breakers with considerable success. But Dr. Hutcheson, following his premise of the value of knowing more about a subject, decided that was not enough. Without disturbing the group concerned with improving existing devices, he set up another whose sole function is to study the fundamental mechanism of current conduction in gases.

Under the dynamic leadership of Dr. Hutcheson, Westinghouse research is opening new horizons for industrial progress. This research enables Westinghouse and industry as a whole to deal more effectively with their problems. Westinghouse Electric Corporation, Pittsburgh, Pennsylvania. C-10239

YOU CAN BE SURE... IF IT'S Westinghouse

PSYCHOLOGY

Rat Is Not So Dumb

Intelligence of white rat has been underestimated, tests show. Telling body's physiological age by measuring blood flow to muscle tissue reported to psychologists' meeting.

▶ A WHITE rat is much brighter than people have thought. Taught to recognize a magazine advertisement, not for cheese, but for strawberry ice cream, he can then pick it out from five other ads showing a pretty girl, a baby, printed matter, etc.

He does this by jumping toward the doorway marked with the right ad. Behind the door, he finds a reward of food.

The reason why the intelligence of the rat has been so underestimated, Dr. Paul E. Fields, professor of psychology at the U. S. Air Force School of Aviation Medicine, San Antonio, Tex., told the American Psychological Association meeting in Washington, is because psychologists testing rats have not made it clear to the animal what they wanted it to do.

Humans make a mess of the rat problems, too, when they have no more instructions than the rat does.

When the rat has a little advance coaching in recognizing one magazine advertisement, he can then pick it out from a whole row of ads and do it very accurately. He can also tell one letter of the alphabet and single it out from a row of others. He can pick one ink-blot from other splotches, and can distinguish a pattern of stripes from others a hairsbreadth wider or narrower.

The rat does better, in fact, on the complicated problem of picking one advertisement out of five similar ads than he does on a simple two-way choice. That is because, Dr. Fields said, the rat attends better to the more complicated problem, and does not get "bored" so quickly.

Once the animal learns to look for one particular ad, it does not matter where it is placed along the panel. The rat will run along the panel looking for the right one. When he finds it, then he jumps.

Actually, the rat is bright enough to serve as a stand-in for human flyers in measuring what the hazards of future flying will do to a man's mind and ability in combat, Dr. Fields told the meeting. Thus rats can be substituted for men in tests of the effects of exposure to radiation, certain gases, drugs and extremes of temperature, altitude and acceleration.

Blood Flow Tells Age

▶ WHAT MAY lead to a good test of the real physiological age of the human body was reported to the American Psychological Association meeting by Dr. Hardin B. Jones of the Donner Laboratory at the University of California.

Further development of the method may yield a better yardstick of retirement for workers than the present arbitrary chronological age, usually around 65.

Scientists long have known that people's bodies age at different rates. Some individuals at 40 may have bodies that are effectively as old as the bodies of others at 60. Some men at 65 are capable of many more years of fruitful work, while others might profitably be retired at 60. But no accurate measure of these differences has ever been found.

Dr. Jones and his colleagues selected the circulation of blood to muscle tissue as a possible test. The blood provides nourishment for tissue, and the amount of blood going to the tissues determines how efficiently the tissue works. Inefficiency is a sign of aging.

The scientists found that there is a progressive reduction with age in the circulation of blood to the muscles. Between 18 and 25 years of age, the blood circulation to the muscles in the average person is reduced 40%. Between 25 and 35, there is another reduction of about 33%. And the reduction continues progressively.

In the average 18-year-old, 25 cubic centimeters of blood passes through one liter of tissue each minute. In the average 25-year-old, the figure is 15 cubic centimeters; in the average 35-year-old, 10 cubic centimeters.

Dr. Jones found wide variations in individuals in the same age group. Thus, some 20-year-olds with the lowest circulations to muscles were about on a par with the 60-year-olds with the highest circulations.

The studies were made with the aid of radioactive gases—argon, krypton and nitrogen. Subjects inhaled the gases, and a Geiger counter was placed over muscle tissue to determine the circulation of the radioactive atoms.

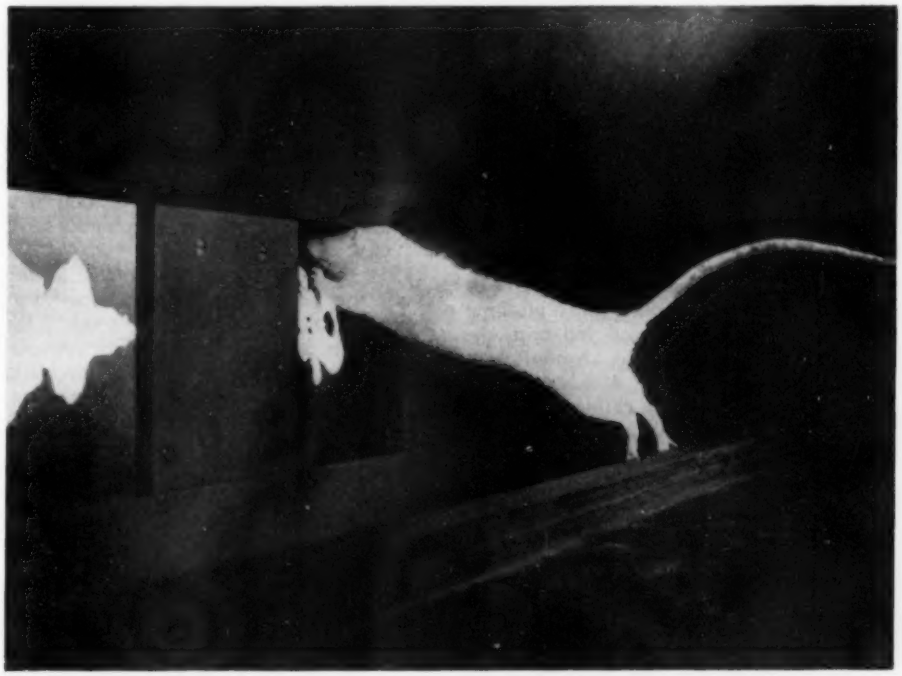
Dr. Jones said that progressive reduction of blood through muscles is clearly associated with the aging process. Whether the reduction itself is the cause of aging, or whether some aging mechanism cuts down on the need for blood by the muscles is not yet known.

Mental Illness Duration

▶ JUST BECAUSE a patient has been mentally ill for a long time is no reason why the family should give up hope that he will get better.

This reassurance was obtained from a study of all the cases admitted to Western Psychiatric Institute and Clinic during the eight years from 1942 to 1950, excepting cases with organic involvement of some sort. The study was described to the American Psychological Association by Dr. Clifford H. Swensen, Jr., of the University of Pittsburgh.

The 486 cases studied were divided into two groups: improved and unimproved. Then cases were dropped from each group until there were no differences between them on any of the other factors which in-



SMART RAT—Picking out the ink blot behind which lies his food, this white rat in tests has shown psychologists that such an animal is smarter than was previously thought.

fluence recovery, such as type of treatment. By this time there were only 94 cases left in each group. But there was no difference between the two groups in duration of illness.

Certain personality traits characterize those psychoneurotic patients who are going to respond to treatment, Dr. Selig Rosenberg of the Brooklyn (N.Y.) Veterans Administration Regional Office told the same meeting.

Veterans who improved under treatment had higher intelligence, greater productivity, less resistance to change, greater range of interests, greater emotional depth, more sensitivity, higher energy level and less concern over their own aches and pains than did the psychoneurotics tested who failed to improve.

What makes the difference, Dr. Rosenberg believes, is that the patients with these personality traits had more ability and desire to do their part toward getting well.

8 Out of 100 Maladjusted

➤ WHEN TEACHERS pick the children in their care who need the help of a mental health clinic they select eight out of every 100. But these eight are not necessarily those most in need of help.

This is shown by a survey reported to the psychologists by Dr. Charles A. Ullmann, who worked in the Prince Georges County, Md., Mental Health Clinic, a demonstration clinic of the U. S. Public Health Service.

Four boys to every one girl were picked by teachers as being seriously maladjusted. That is about the same proportion of boys and girls as are taken before the juvenile courts. Classmates picked an even higher proportion of boys as maladjusted.

That is because the mental health problems of boys are the kind that get them into trouble—restlessness, sex drives, and a resentment of authority and school demands.

Girls are more likely to suffer from inner conflict, worry, over-dependence on others, timidity and concern over bodily ailments.

Teachers are likely to regard the polite, obedient child as mentally healthy.

Thus it is the sullen, defiant boy who is likely to be taken to juvenile court. Nothing is done for the shy, worried girl until she finds her way eventually as an adult to a mental health clinic or mental hospital.

And the doctor at the children's mental health clinic is most likely to see the unwilling, antagonistic patient who is least likely to cooperate and benefit from treatment.

It may be desirable, Dr. Ullmann suggested, to develop a new technique for referring patients so that cases will be picked that will give the greatest return in community mental health for the least expenditure of professional time.

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An estimated 15% of America's motorists have *vision* so far below standard that it is dangerous for them to drive a car.

SOCIOLOGY

Loyalty Oaths Lashed

Society for the Study of Social Problems charges loyalty oaths being used by some groups to make their ideas about democracy the only acceptable view.

➤HITTING OUT against "loyalty oaths" and against a continuing trend of encroachment of religious sects in the schools, an organization of sociologists has called for vigorous fights against both.

Loyalty oaths, said a committee of the Society for the Study of Social Problems, meeting in Atlantic City, have become the method used by organizations and groups with a narrow view of democracy to make their view of loyalty the only view. This, the group said, makes it possible for all forms of bigotry, intolerance, totalitarianism and organized ignorance to use organized power to substitute another concept of loyalty for the democratic concept.

The trend toward increasing use of public tax money to pay for education under religious auspices is a direct threat to the basic fundamentals of sociology, the group declared. Sociologists base their beliefs on natural fact, it was said; where the facts are not demonstrated, the sociologist is agnostic.

Religious beliefs are based on faith and, as such, are therefore, antagonistic to sociological concepts of the family and society. If the sociologist wishes to supplant that which cannot be demonstrated from the facts with a faith, that is his private right, but it has nothing to do with sociology, the group said.

The committee of sociologists pointed out that the framers of the American constitution argued long about the relation of the church to the state. They decided, the committee said, that the two must be completely separated. The committee said that the fight to maintain this separation is a practical fight in which all sociologists must participate.

Even before the appearance of the loyalty scare, the committee said, sociology was looked upon as a subversive science, because of its desire to find the truth concerning sex, race, crime, propaganda, power and the forces of ignorance and superstition. There is already a tendency among teachers and even scholars, the committee pointed out, to preface their remarks on a subject by disowning communism, Marxism, Russia and other things which they never owned, in order that their positions may not be misconstrued.

Sociology, the group concluded, has an inherently rebellious aspect in that its aim is to ask questions involving the very way in which society is organized; and if that be disloyalty, it will simply be necessary for us to see that ignorance and bigotry do not make the most of it.

The Society for the Study of Social Problems was organized to promote and protect sociological research and teaching on significant problems of social life.

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SURGERY

Anti-Cancer Hormone in Cancerless Duodenum?

➤THE FIRST ten inches of digestive tract leading from the stomach, called the duodenum, may hold the clue to the whole problem of cancer, Dr. Andre B. Carney of Tulsa, Okla., told the meeting of the International College of Surgeons in Chicago.

He based his opinion on the fact that cancer almost never starts in this portion of the digestive tract, although it is a frequent site of ulcers, and nearby organs have high cancer rates.

Existence of an anti-cancer hormone in the walls of the duodenum may be what protects this organ, he suggested.

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BIOCHEMISTRY

Hope Pill Can Control High Blood Pressure

➤ HOPE THAT high blood pressure can some day be controlled by a pill appears in a discovery announced by Drs. D. W. Woolley and Elliott N. Shaw of the Rockefeller Institute for Medical Research, New York, in the *Journal of the American Chemical Society* (Aug. 20).

The pill would contain a chemical of the class called alkyl nitro-indoles. The safety and effectiveness of these and the fact that they act when taken by mouth have already been shown in laboratory animals.

These new, potential anti-high-blood-pressure chemicals were developed by changing the chemical structure of serotonin. Serotonin can make blood vessels constrict and raise the blood pressure of normal animals. It is not found in normal blood but is found in the blood of patients with the high blood pressure called essential hypertension.

Although it has not been proved to be the cause of high blood pressure, serotonin seemed suspiciously like such a substance, so Drs. Woolley and Shaw proceeded to make chemicals related to it which would lower the blood pressure that had been elevated by serotonin.

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PHOTOGRAMMETRY

Polaroid Instrument Teaches Map-Making

➤A NEW instrument to train future map-makers to spot details easily and quickly in three dimensions went on display the first time at the opening session of the Seventh Congress of the International Society of Photogrammetry in Washington.

Usable in a small booth, the instrument throws two photographs on a screen with polarized light. The image is viewed with polaroid goggles, a pointer allowing the teacher to indicate specific details. Dr. Bertil Hallert of the Officine Galileo, Florence, Italy, perfected the instrument.

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MOCK RESCUE—Civil Defense workers demonstrate a method that can be used to remove injured persons from a badly bombed dwelling. Buildings at the National Civil Defense College, Olney, Md., have been carefully constructed to be realistic, yet safe for teaching rescue techniques.

GENERAL SCIENCE

Civil Defense Manual

➤ LITTLE OR no thought of protection against atomic bomb blast is being put into the 20 billion dollars spent for new building construction of all kinds, the Federal Civil Defense Administration has found.

The charge was made in a new manual issued by the agency called "Windowless Structures, a Study in Blast-Resistant Design." It tells how a building can be constructed to withstand the terrific blast from an atomic bomb.

New buildings, the authors say, can be designed to take advantage of the fact that the pressure of the blast from an A-bomb drops to zero in less than a second. It is during that fraction of a second that the bomb delivers a punch that cannot be taken by buildings designed before the atomic era.

The windowless structure the manual recommends is designed to give with the atomic blow and absorb it. The building is left somewhat deformed, but the people inside can go right on working with no damage.

The manual is an introduction to the problem of making our buildings atom-blast proof. The windowless structure is not offered as an exact model for all new buildings, but many of the principles demonstrated, say the authors, can be incorporated into new construction.

The new methods were developed by Ammann and Whitney, New York, consulting engineers. Consultants included Prof. N. W. Newmark of the University of Illinois and Drs. John B. Wilbur, Charles H. Norris and Robert J. Hansen of Massachusetts Institute of Technology. Methods of evaluating the force of an atomic blast were prepared by C. W. Lampson and J. Meszaros of the Army Ballistic Research Laboratories.

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PSYCHOLOGY

Schizophrenia Found A Poor Man's Disease

➤ THE MOST common of the mental diseases, schizophrenia, is a poor man's illness. Those in the upper levels of society are more likely to be neurotic.

This difference in mental illness in different social classes was brought to light by a survey of approximately all the psychiatric patients under treatment on a given date who were residents of the metropolitan area of New Haven, Conn.

In general, it was found that mental disease is not a luxury of the pampered rich. The number of cases increases as the social level goes down.

Results of the survey were reported to the American Psychological Association meeting in Washington by Drs. H. A. Robinson, F. C. Redlich and A. B. Hollingshead of Yale University.

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GENERAL SCIENCE

Science's Ethical Dilemma

Prof. A. V. Hill, speaking as president of the British Association for the Advancement of Science at Belfast, discusses dangers and morality of science.

Excerpt from the presidential address before the BAAS by Prof. A. V. Hill, physiologist, Nobelist and Foulerton Research Professor of the Royal Society.

➤ NUCLEAR FISSION has released the threat of unprecedented violence, with the possible destruction of many millions of lives and the accumulated treasures, moral and material, of civilization. The individual conscience may tell a man to have no part in it: that is easy enough, for there are plenty of other interesting things to do, but it does not solve the problem. Moreover, it is possible that defensive weapons, based on nuclear fission, but not of the type intended for mass destruction, can be developed which would make armed aggression intolerably costly.

What then of the abolition of secrecy? In principle, yes, for the historic and unique contribution of science to international goodwill has been in sharing knowledge regardless of race and frontier, and the chief satisfaction of scientific work, the condition of its fruitful development, is frank and free discussion.

"Cast thy bread upon the waters, for thou shalt find it after many days," is wise and acceptable counsel in dealing with scientific knowledge: while "he that observeth the wind shall not sow and he that regardeth the clouds shall not reap," is as aptly applied to human relations as to agriculture.

Every possible endeavor, therefore, should be made towards international agreement on sharing scientific and technical knowledge and controlling nuclear weapons: but this, like peace itself, is a concern of every citizen, not only of scientific people.

Much scientific and technical advance has led to unexpected dangers and difficulties. Without our present knowledge of bacteriology and preventive medicine, gigantic armies could never be kept in the field, and land war on the recent scale would be impossible: is medical science, therefore, to be blamed for twentieth-century war? The indiscriminate use of insecticides, by upsetting the balance of nature, can quickly do more harm than good. Radio communication may be used for spreading lies and disorder as well as truth and goodwill. Developments in microbiology, in many ways beneficient, may be used in the future for biological warfare, with effects at present unpredictable; and control by international agreement and inspection might be very difficult.

The list need not be multiplied, all are aware that every new benefit to mankind provides also its own dangers, either as unexpected consequences or by deliberate misuse. Science is not alone in this: liberty may lead to license, religion can be used to inflame passions, laws can be exploited to protect wrongdoing. If scientists feel called upon to examine their consciences, so much the better: but they need not imagine that in this they are exceptional!

It has been debated whether "the scientific mind is fundamentally amoral." The real answer is that there is no such a thing as *"the* scientific mind." Scientists for the most part are quite ordinary folk. In their particular scientific jobs they have developed a habit of critical examination, but this does not save them from wishful thinking in ordinary affairs, or sometimes even from misrepresentation and falsehood when their emotions or prejudices are strongly enough moved. Their minds are no more amoral than those of surgeons, lawyers, or scholars. As investigators most of them realize that their function would be stultified were they to introduce moral data into a scientific argument.

A surgeon is not required, or indeed allowed, to consider whether it would be better for the world if his patient died under the operation, he has only to carry it out with skill, care and integrity: but it would be foolish to conclude that the surgical mind is amoral. The surgeon himself, as a human being, has to make moral judgments: but he does so outside the operating theatre.

So it is with scientific people: like all good citizens they must take account of ethical considerations, and the chief of these, as with other good citizens, are of integrity, courage and goodwill. Integrity forbids them to allow feelings of any kind to obscure facts, but that does not make them amoral: after all, integrity is the first condition of morality.

In the practical world of today, complete abandonment of secrecy, in government and industry, is out of the question. The advantages to international relations, and to general scientific progress, of the greatest possible freedom are evident; to these can be added the impossibility, in a free democracy, of keeping the best people unless the conditions of their work are congenial. If scientific men consistently avoid jobs which seem to them to fall short of reasonable freedom, they will force changes of organization so that only necessary secrecy is maintained. The penalty of filling an organization, governmental or industrial, with second-rate people, cheerfully amenable to unnecessary restrictions, is far too evident in its result on efficiency to be tolerable for long. The cure, therefore, is largely in scientists' own hands. In this, as in many other aspects of their work, moral considerations come in, and the only way to resolve the dilemma which is in so many minds is to discuss it frankly. To neglect it altogether is not amoral but immoral, it is the duty of all of us as citizens to consider the ethical basis of our work.

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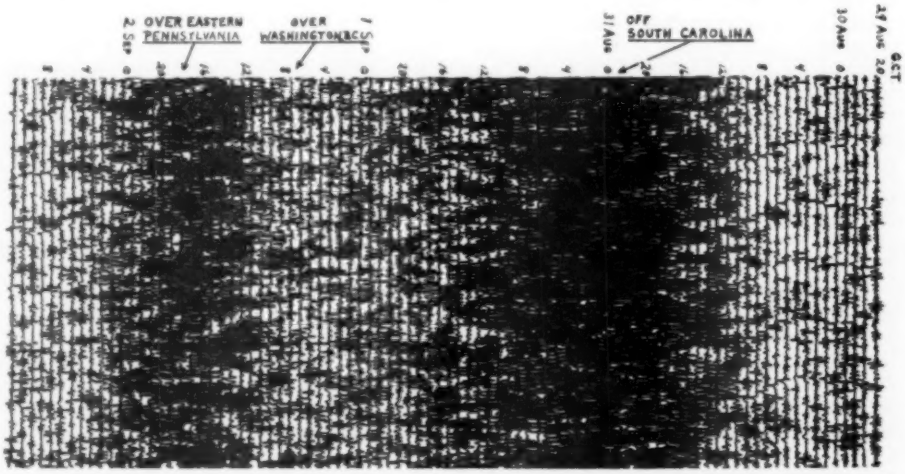
SEISMOLOGY

Two Seismograph Peaks Show Recent Hurricane

➤ THE HURRICANE that lashed the East Coast over Labor Day weekend was recorded on a seismograph at the U. S. Coast and Geodetic Survey in Washington. Microseisms generated by the superstorm show two black, very well-defined peaks.

The peaks, Leonard Murphy of the Survey explained, indicate the path of the twirler, and the records are not often clear enough to do this. After slamming the East Coast



HURRICANE'S MICROSEISMS—The two black areas in this seismograph are caused by the many microseisms from the hurricane that swept the East Coast Labor Day weekend. The unusually well-defined peaks occurred when the storm's center was over the Atlantic.

FLAME-THROWING TANK—One of the Army Chemical Corps' newest weapons is the giant flame thrower, mounted on an M-47 medium tank. shown in the photograph.

near South Carolina, the storm moved northeast over upper Virginia and Maryland, then whipped through eastern Pennsylvania, lashing the New York area.

Microseisms register when the low pressure area at the storm's center is over the ocean.

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GENERAL SCIENCE

Company Magazines Using More Science

➤ THE NATION'S leading house magazine editors are using more stories of science today than at any time in their history.

Nearly 40% of all editors surveyed by the Gebbie Press in a nation-wide poll say that at least one story dealing with scientific material appears in every issue of their publications, and that they wish they had more such stories.

The birth of the atomic age and private industry's vast contributions to both the wartime and peacetime uses of atomic bombs and by-products are credited with creating much of the editors' interests in science, according to the Gebbie Press.

Many company publications that before the war never deviated from the tried-and-true editorial approach of presenting purely local company news and gossip now devote considerable space to scientific stories.

Results of the survey, published in a 190-page volume titled "The Nation's Leading House Magazines," show that stories with scientific subjects or slants even out-pull women's fashion copy and cheesecake pictures. (See SNL, July 12, p. 28.)

The 1,400 house magazines polled have 55,000,000 combined circulation.

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SURGERY

Gallstones Operation For Baby Under One

➤ THE FIRST case recorded in medical history of gallstones in a baby under one year with recovery of the baby is reported by Drs. William H. Snyder, Jr., Lawrence Chaffin and Leon Oettinger of Los Angeles in the *Journal of the American Medical Association* (Aug. 30).

About 90 cases of gallstones in infants have been reported since the first one was recorded in 1767, almost two centuries ago, by J. Lieutaud in a French medical journal. In all of these earlier cases, however, the baby died and the condition was discovered or confirmed in examination of the infant's body after death.

The baby who is the first known to survive is a girl. She thus fits one of the five F's—female, fair, fat, forty and fertile—which used to be taught as a description of the typical gallbladder disease patient.

This baby girl was six weeks old when admitted to the Los Angeles Children's Hospital with a diagnosis of intestinal obstruction. At operation, one small stone was found in the gallbladder, which had ruptured, and numerous gall stones were found in the common bile duct, which conveys bile to the first part of the small intestine. This duct was so small and crowded with stones that the surgeon had some difficulty in getting them out. He solved the problem by fitting a narrow bore plastic tube into the common duct and forcing the stones out under syringe pressure.

The baby recovered and is still well three months after operation, the three doctors report.

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TECHNOLOGY

New Flame Thrower Mounted on M-47 Tank

➤ THE LATEST U. S. medium tank has a new flame thrower as its main armament, replacing the usual cannon. Built primarily for use of the Marine Corps in assault operations, a giant flame thrower is mounted on an M-47 body.

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PSYCHOLOGY

Dogmatic Persons' Politics Vary Widely

➤ COMMUNISTS ARE not the only ones with dogmatic opinions. In fact, dogmatic individuals are found in just about equal numbers among the extreme leftists, extreme rightists and among the middle-of-the-roaders. They may be dogmatic about politics, religion, philosophy or science.

This was disclosed by a study of the opinions of college students reported by Dr. Milton Rokeach of Michigan State College, Lansing, to the American Psychological Association meeting in Washington.

Some personality traits are common to all strongly opinionated persons, Dr. Rokeach said, whether they are liberals, conservatives or in-betweens. They are intolerant of criticism. They need to over-identify with some cause. They want to punish the renegade from their particular ideology. They do not like to compromise, but are willing to be martyred for the cause. They tend to dislike themselves and to be suspicious of others and they fear to be alone.

Dogmatic persons are inclined to subscribe to statements prefaced with some such extreme wording as "Only a simple-minded fool would think that . . ." followed by some remark about America, Russia, China, labor, God, race differences, MacArthur or other controversial subject.

Dogmatic persons are those most likely to accept dictatorship, Dr. Rokeach found.

A measure of dogmatic personality and a scale for picking out opinionated persons have been developed by Dr. Rokeach on the basis of his findings.

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PSYCHOLOGY

He-Man Music Preferred by All

➤ AMERICANS PREFER music they judge to be masculine, especially when they know others think that the music is fit for he-men.

Both sexes consistently prefer masculine music, Dr. Carl H. Rittenhouse, psychologist at Lowry Air Force Base, Denver, Colo., told the American Psychological Association. The most masculine men and women with mannish manners have strongest preference for masculine music.

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BIOCHEMISTRY

Danger of Nerve-Gas Type Chemicals Reduced

➤ THE NERVE-GAS type insecticides, such as Parathion, and probably the nerve gases too, can have their dangerous skin-penetrating power reduced by more than 100 times through a new kind of emulsifier.

Results of tests showing this are announced in *Science* (Aug. 29) by Drs. William B. Deichmann, Patricia Brown and Charles Downing of Albany Medical College, Albany, N. Y. (See p. 172.)

The emulsifier tested by the Albany scientists is known only as Emulsifier 42-1 A. Chemically, it is an aromatic polyglycol ether obtained when ethylene oxide is added to a phenol of high molecular weight. It is unusual because most emulsifiers increase the toxicity of a chemical by making the compound more soluble. Emulsifier 42-1 A does just the opposite.

The insecticide, however, does not lose its poisonous property for insects as a result of the emulsifier's action.

An emulsifier of this type was first made in Germany, but the one Dr. Deichmann and associates tested is being made in this country by the Chemagro Corporation of New York. In his tests, Dr. Deichmann used it with a new insecticide, also made by Chemagro, called Systox. This is a systemic organic phosphate insecticide of the so-called nerve gas class.

The emulsifier and insecticide are mixed and shipped in a concentrated form. It is in this form that the insecticide's ability to penetrate skin and thus cause poisoning is reduced 100 times. But when the emulsifier-insecticide mixture is diluted with water, as the farmer will do when he uses it, the original toxicity of the insecticide is restored.

The emulsifier's protective action is on skin penetration. It is much less effective in case the insecticide is swallowed.

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MEDICINE

Penicillin Treatment For Burns Plus Radiation

➤ VICTIMS OF atomic bomb attack who have gotten burns as well as non-fatal doses of radiation might be saved from death by penicillin, Dr. Everett I. Evans, professor of surgery at the Medical College of Virginia, Richmond, declared in a report at a Symposium on Trauma held at the Army Medical Service Graduate School in Washington.

A combination of non-fatal burn and non-fatal dose of radiation can be killing, even if neither alone would be fatal, Dr. Evans found in studies of experimental animals.

The addition of 100 roentgens external radiation (400 rotentgens or more constitutes a lethal dose) to a standard burn injury resulted in a sharp increase in mortality. A mortality of 12% from the burn alone increased to 75% with the addition of 100 roentgens total body gamma radiation, and to 20% with the addition of only 25 roentgens total body gamma radiation.

Of the mechanics by which mortality rises, Dr. Evans says, "With combined thermal (heat) and radiation injury, entrance into the blood of non-hemolytic streptococci is shortly followed by invasion with more virulent beta hemolytic streptococci, which brings about a fatal septicemia in 75% of the animals. It appears likely that radiation (radiation well below the lethal level) depresses the phagocytic activity and other defense mechanisms to a point where they are unable to localize the beta streptococci at the wound surface. The beneficial influence of penicillin therapy, in reducing sharply the mortality of experimental animals receiving the combined thermal and radiation injury, points to the need for provision of this therapy for victims of atomic bomb attacks, and provides hope that such therapy may reduce the mortality from such combined injury.

"The studies and results reported here should not be confused with those in which lethal amounts of external body radiation are used," Dr. Evans warns.

Science News Letter, September 13, 1952

DENTISTRY

Heat-Processed Cereal Causes Rat Tooth Decay

➤ WHETHER YOU get your protein largely from eggs, meat and milk or from cereal foods, especially the ready-to-eat breakfast cereals, may have something to do with whether your teeth decay.

This new approach to the problem of the relation of diet to tooth decay is suggested by studies by Dr. F. J. McClure of the U. S. National Institute of Dental Research, Bethesda, Md.

He has worked out a diet that causes decay of rats' teeth of a kind very similar to that seen in human mouths afflicted with caries. This in itself is something of an achievement, because heretofore dental scientists trying to solve the decay problem have had trouble getting a laboratory animal to develop a human type of tooth decay for study purposes.

The diet Dr. McClure has worked with is deficient in a number of essentials. In his report to *Science* (Aug. 29), he calls particular attention to the "obvious inadequacy of the cereal protein," especially its lysine content. Lysine is one of the essential amino acids. He also points out that the cereals have been heat-processed, which has recently been reported to change the nourishing quality of protein.

Diet 586, which produced the human type caries in the rats' teeth, is relatively low in sugar and does not involve a coarse particle factor which some other scientists have reported as a factor in bringing on tooth decay.

Science News Letter, September 13, 1952

IN SCIENCE

SURGERY

Latest Spare Part: Plastic for Human Gullet

➤A NEW spare part doctors have developed for the human body is a plastic tube that doubles for the esophagus, or gullet, down which food passes to the stomach.

Thirty patients have been fitted with this spare part in the last two years, Dr. Edgar F. Berman of Baltimore reported at the meeting of the International College of Surgeons in Chicago.

Of these, 28 patients had cancer of the esophagus. The cancerous portion was cut out and a plastic tube from four to nine inches long was put in its place.

Comparing results in these patients with those obtained by conventional surgical procedures, Dr. Berman said that the mortality was considerably decreased and "the comfort of the patients tremendously improved."

Patients will live longer to the extent that the new procedure takes less time and gives the surgeon more time to find and remove glands near the esophagus that might be cancerous and, if not removed, would shorten the patient's life.

The plastic tube may stay in place permanently, or it can be removed after being completely surrounded by a fibrous sheath which forms within 60 days.

Science News Letter, September 13, 1952

AERONAUTICS

Fighter Plane Firepower In Wing-Tip Rockets

See Front Cover

➤ROCKET FIREPOWER in wing-tip pods gives the Northrop Scorpion F-89D, an all-weather, heavily-armed interceptor plane, a double-barrelled "grand slam" in attacking an enemy invader.

Advantages of the 2.75-inch rockets in the wing tips instead of in the conventional position in the fuselage include:

Greater target area is blanketed.

Large numbers of rockets can be carried.

Firing does not interfere with the vision of the pilot and radar observer at the critical moment of interception.

Jet-engine intakes are not exposed to smoke and debris produced by rocket fire.

In the version of the Scorpion designated the F-89C, fuel-dumping valves are now installed in the wing-tip fuel tanks for use when a quick weight reduction is essential in combat. The fuel tanks of the F-89D are a permanent part of its structure and can not be dropped off as in many jet fighters. They carry supplementary fuel.

Science News Letter, September 13, 1952

E FIELDS

ASTRONOMY

Double Stars Closer As They Grow Larger

➤ DOUBLE STARS get closer and closer together as they grow larger and larger, Dr. R. A. Lyttleton of St. John's College, Cambridge, Eng., told members of the International Astronomical Union meeting in Rome, Italy.

Stars are growing all the time because they pick up interstellar hydrogen as they make their way through space, according to one of the latest astronomical theories. Double-star systems represent stars that have been gradually drawn together by this accretion, Dr. Lyttleton pointed out.

"Binary stars begin as very widely separated small stars," Dr. Lyttleton said. "As they increase in mass, they are drawn closer and closer till they eventually merge into a single star."

The whole course of evolution of binary stars, as outlined by Dr. Lyttleton, is almost the exact reverse of that visualized by the famous British astronomer, the late Sir James Jeans. His theory, accepted for half a century, pictured double stars as resulting from the break-up of a single rotating star.

Given the slightest disturbance, Dr. Lyttleton reasons, an unstable rotating liquid star would probably break into two unequal pieces. But these parts, instead of forming a close binary system, would be thrown away from each other with such violence that they would separate altogether.

Science News Letter, September 13, 1952

PHYSIOLOGY

Test Tells Whether Death Due to Drowning

➤A NEW test to tell whether a person died of drowning or was dead before his body was thrown or fell into the water was announced by Drs. Stanley H. Durlacher and Henry E. Swann, Jr., of the Chemical Corps Medical Laboratories, Army Chemical Center, Md., and Dr. Henry C. Freimuth of the Office of the Chief Medical Examiner, State of Maryland, at the meeting of the American Physiological Society in New Orleans.

In cases of death by drowning, these scientists, find, the blood in the left side of the heart is slightly lighter in weight per unit volume than that in the right side of the heart. Their new test is made by measuring the specific gravity of the serum or plasma from blood from each side of the heart and comparing the two. The specific gravity gives the weight of a substance compared with that of an equal volume of another substance taken as a standard.

More tests in deaths from various causes are still needed, the scientists said, to be sure the changes in specific gravity are consistent and that the new test is completely reliable for showing death by drowning. But they presented at the meeting final evidence showing that the currently used chloride concentration test is not valid.

This test is based on the difference in chloride concentration in the blood in left and right sides of the heart. Too many changes occur in chloride concentration after death, the scientists found, for this test to give reliable information.

The new test is simpler and quicker than the chloride test. It is based on the fact that when a person drowns, some water must go into the lungs and some, whether salt or fresh, will go to the left side of the heart and then to the right side. At one point, when death comes, there will be slightly more water in the left than the right side. Because of the greater amount of water, the blood in the left side will be lighter in weight per unit volume than that in the right side.

Science News Letter, September 13, 1952

PUBLIC HEALTH

Do Not Stuff Bird Before Freezing It

➤ DO NOT stuff your turkey before you put it in your freezer. This advice comes from the U. S. Department of Agriculture home economists.

Stuffing the birds before freezing may seem like convenient advance preparation. But it may endanger the health of your family and guests who eat the turkey later.

The explanation is that stuffing inside a turkey takes a long time to reach the freezing point. Meanwhile, germs may start growing and continue their growth later as the bird thaws and then warms up slowly in the oven.

One study made by industry showed that the center of the stuffing in a pre-freezing stuffed turkey did not get hot enough to kill spoilage bacteria until long after the meat of the bird was well cooked. So, to escape the danger of food poisoning, freeze the turkeys without stuffing.

Another point to remember, the Department of Agriculture home economists point out, is that in preparing for the freezer, the giblets, that is, the gizzard, heart and liver, should be wrapped separately and either frozen in a separate container or placed in the cavity of the bird.

Turkeys are reported a good buy now, so early turkey-shopping is suggested for families with home freezers.

These birds used to be considered feast-day or special-occasion food. Part of the reason was their large size and part the fact that they did not come on the market in abundance so early. Now, with the modern small-size turkeys available, housewives can include turkey along with chicken and other fowl, meat, fish, eggs and cheese dishes as main dish protein foods.

Science News Letter, September 13, 1952

NUTRITION

Flash-Sterilized Milk Keeps Natural Flavor

➤ CANNING OF flash-sterilized milk in sterile containers to replace long heating in a sealed can is perhaps the most exciting event that has taken place in the dairy industry, Dr. Charles Glen King, scientific director of the Nutrition Foundation, New York, said in Chicago recently. Natural flavor is kept by this method, he said.

During the past 20 years, he told the symposium on food of the Centennial of Engineering, much has been learned about what is in foods, how they are formed, and how the nutrients function in protecting human health.

As examples of major improvements in our food supplies, Dr. King said that:

Frozen canned orange juice, lemonade and lime juice have an assured vitamin content roughly equal to that of fresh juice.

Strong competitors to evaporated milk are being developed in the form of canned whole milk, frozen milk, powdered milk and milks with low fat content.

Development of new foods for the future may be aided by a new kind of professional, the biochemical engineer, Dr. King said. His raw materials of today—food—literally make the men of tomorrow.

"It is no simple task," he said, "as we look ahead a few years, to provide the physical means of building the world's three billion human bodies and minds to their respective individual peak levels of vigor and attainment, on a life-span basis."

Although "sales may grow on hot air for a time, children cannot," he stated. There are now about 50 nutrients essential to human life, and the list is growing.

The degree of success of the food industry in meeting its responsibility in health, economy and public confidenee, Dr. King concluded, will be an important measure of man's capacity for progress in the century ahead.

Science News Letter, September 13, 1952

SURGERY

Bone Flap Used to Remedy Groin Rupture

➤A FLAP of bone with its tough fibrous membrane may be the solution to the problem of the discouraged, often disabled patient with an inguinal hernia, or rupture in the groin, which keeps coming back in spite of various attempts to correct the defect.

The bone flap, measuring about two by one and a half inches, is taken from the patient's pubic bone and attached to the bands of tissue connecting the muscles of the abdomen.

This technique was reported by Drs. William M. McMillan and Robert T. McElvenny of Northwestern University Medical School in Chicago at the meeting of the International College of Surgeons in that city.

Science News Letter, September 13, 1952

ASTRONOMY

Pinwheels in the Heavens

Pinwheels of stars and shining nebulae glow in the night skies, so enormous they take hundreds of millions of years to complete a single turn.

By MARTHA G. MORROW

➤ THERE ARE fireworks in the heavens. Pinwheels of stars and shining nebulae glow in the night skies. Long arms of stars, bright dust and gas spiral outward from their fiery centers.

These permanent pinwheels of the heavens take hundreds of millions of years to make a single turn. Yet they are so enormous that individual stars racing around the center travel hundreds of miles each second.

Some of these heavenly fireworks are so distant that you can see them only with the world's best telescopes. A few can be picked up with a home-made model. One or two you can see with the unaided eye if your eyesight is good.

There is one starry pinwheel, however, that everyone can see, at least in part. Just go far from city lights on a clear, moonless night during late summer, and you will see the Milky Way glowing faintly across the heavens. This band of soft, misty light encircling the sky comes from millions of stars too faint to be seen without a telescope. They outline the pinwheel galaxy to which our earth and sun belong.

We are riding on a cosmic carousel. The Milky Way is our celestial merry-go-round. This gives us the disadvantage, however, of being on the inside, looking out. It is difficult to visualize how our galaxy looks and just where we are in relation to the myriad of other stars.

Pocket-Watch Shape

All spiral galaxies are shaped like a pocket watch. Spinning has flattened them out. The Milky Way galaxy to which we belong has this same shape. It is about ten times as broad as it is thick.

The center of our galactic system is located in the direction of the constellation of Sagittarius, the archer, visible low in the south these September evenings. It would take light, traveling some 186,000 miles a second, 25,000 to 30,000 years to reach its center. This estimate was made by Dr. Harlow Shapley, director of Harvard College Observatory, some 20 years ago and his figures are still accepted.

It takes about 200,000,000 years for our spiral galaxy to make one complete revolution. Yet we, the sun and other stars in our neighborhood, are racing around the center of our universe at a speed of some 150 miles a second.

We actually are located in an outer spiral arm of our pinwheel galaxy. People in the United States cannot see this luminous arm, nor even stars marking the direction in which it lies. The constellation of Carina, the ship's keel, is visible only in the southern hemisphere. Dr. Bart J. Bok, associate director of Harvard College Observatory, has recently demonstrated that the Eta Carina Nebula is really a luminous knot in one of the spiray arms of our Milky Way.

The Milky Way is enormous, even for a galaxy. Light would take 100,000 years to cross it. Yet it is only 10,000 light-years thick at the central bulge.

But stars belonging to our system are found much farther out from the center than this. A thin haze or corona of stars encircles the main discoid system. This atmosphere of stars, tens of thousands of light-years thick, envelops our galaxy.

Fully a hundred billion stars belong to our celestial pinwheel. Some 6,000 of these are near enough and bright enough to be seen with the unaided eye. Our galaxy

GREAT NEBULA OF ANDROMEDA—This spiral nebula is believed to be much like our own Milky Way galaxy, both in size and shape. By studying our neighbor, astronomers are learning much about the universe to which our solar system belongs.

also contains vast clouds of gas and dust. Some of these are quite luminous and shine in our night sky; others are dark and cut off some of the light of stars beyond them.

We fail to see many nearby stars because of these dark clouds. Others are just faintly seen when in reality they are quite bright objects. Much of this dark material lies between us and the hub around which our galaxy rotates, cutting off our view of the millions of bright stars clustered together there.

An enormous cloud of obscuring dust and gas, shaped like a slightly-bent cigar, divides the Milky Way at places into two branches. You can easily see these two branches on a clear, dark night in the late summer. Look toward that part of the Milky Way which extends from the constellation of Cygnus, the swan, in which you will find bright Deneb high in the evening sky, down between Altair in Aquila, the eagle, and the serpent's tail, and on down to the southern horizon.

Stars of high surface temperature and great brilliance on the other side of this cloud particularly interest Dr. J. J. Nassau of the Warner and Swasey Observatory, Cleveland, and Dr. W. W. Morgan of the University of Chicago's Yerkes Observatory. These stars, which do not look particularly bright in our sky, are all at least 1,500 times as bright as our sun and many of them are over 10,000 times as bright.

Few Peep-Holes Available

At night when you pass over a city in an airplane, or look at it from the roof of one of the tallest buildings or from a nearby mountain, it is easy to grasp the lay-out of the city by studying the lights that shine in the dark. But if you remain in the street, or look out of a first-floor window, you have a hard time picturing the metropolis. Astronomers are in the difficult position of trying to picture the Milky Way galaxy when they have only a few peep-holes from which to view its lay-out.

There is a nearby pinwheel system of stars, however, which looks very much like our own. Astronomers are using the Great Nebula of Andromeda as a model for studying our own galaxy. This is a most direct attack on the structural problems of our system.

To the unaided eye, the Great Nebula looks like a small luminous cloud or misty star. It is of the fifth magnitude, thus is rather difficult to spot. Its spiral shape appears in a telescope. In photographs with the world's best telescopes, dark lines of obscuring matter as well as bright stars are visible.

It was Dr. Walter A. Baade of Mt. Wilson and Palomar Observatories of the California Institute of Technology and the Carnegie Institution of Washington who first showed the central nucleus of the Andromeda Nebula to be a myriad of individual stars. Before that astronomers had photographed the hot blue stars in the galaxy's spiral arms, but not until World War II were the brilliant red stars in its shining center revealed. Dr. Baade and the 100-inch telescope at Mt. Wilson "captured" them individually for the first time on photographic plates.

With the 200-inch Hale telescope atop Mt. Palomar, Dr. Baade has been exploring this neighboring nebula still further and has been examining other galaxies in detail. He has picked out the individual stars of which they are composed and confirms the work of Dr. F. H. Seares of Mt. Wilson Observatory a generation ago on the location of different types of stars. Hot blue stars are found most frequently in the spiral arms; giant cool red stars tend to concentrate in the nucleus.

Thus Milky Way astronomers have been

furnished another clue as to where we are located in our own galaxy. The presence of numerous hot blue stars, for instance, signals the direction to one spiral arm.

Just suppose astronomers could carry their telescopes to a planet in the Andromeda Nebula. What would our Milky Way galaxy look like from there? Calculations show it would look much like the Great Neubula does to us. Photographs would probably reveal individual giant stars in our galaxy, including most of our variable stars.

Magellanic Cloud Galaxies

Two companion galaxies could also be spotted nearby. They are the Magellanic Clouds. These Clouds are both irregular galaxies which from the earth look like faint luminous clouds broken off from the Milky Way. Unfortunately, they are too far south to be seen from the United States.

The two Magellanic Clouds and the Milky Way galaxy form a triple system. Our galaxy is nearly 30 times as bright as the Small Cloud and six times as bright as the Large Cloud. Yet these clouds are not dwarf galaxies, Dr. Shapley has shown, but are probably brighter and more massive than most galaxies. They whirl around with us in our travels through space.

Science News Letter, September 13, 1952

BIOCHEMISTRY

Nerve Gas Antidote

► AN ANTIDOTE to Parathion and some other nerve-gas types of insecticides, and maybe to the nerve gases themselves, has been discovered.

It is called Buscopan. In treatment of laboratory animals poisoned by Parathion, it is much more effective than atropine. Atropine has so far been considered the best drug for treating both nerve-gas and Parathion-insecticide poisoning.

Buscopan is a German drug. Chemically, it is 1-N-butylscopolammonium bromide. It comes from scopolamine, the "twilight sleep" drug once popular as a childbirth pain-reliever.

The effectiveness of this drug as an antidote to poisoning by insecticides, Parathion, dimethyl Parathion and Systox, was reported by Dr. William B. Deichmann of Albany Medical College to the International College of Surgeons, Chicago. (See p. 168.)

Buscopan, in Dr. Deichmann's opinion, is "terrifically better" than atropine. It acts at the ganglia, which are collections of nerve cells occurring along the chains of sympathetic and parasympathetic nerves. Atropine acts at the nerve endings rather than at the ganglia of these nerve chains. This different spot at which the new drug takes effect may be what makes it, in Dr. Deichmann's experience, so much better than atropine.

Dr. Deichmann emphasized that so far he has only tried the new drug in experimental animals and only as an antidote for the three insecticides, Parathion, dimethyl Parathion and Systox. While these are related to the nerve gases, they are not the same and their effect is somewhat different. Symptoms of Parathion poisoning develop more slowly and are not as responsive to atropine as those of the nerve gases.

Dr. Deichmann also finds that both atropine and Buscopan are more effective when given with oxygen and glucose than when given alone.

Science News Letter, September 13, 1952

SURGERY

Partial Lung Removal

►FOR SOME TB patients having a surgeon cut out the diseased portion of the lung may be better than any other method of treatment, it appears from a "preliminary report" of such an operation on 87 patients.

The operation is called segmental resection of the lung. The promising results in 87 cases were reported by Capt. Clifford F. Storey and Lieut. Bruce F. Rothmann of the U. S. Naval Hospital, St. Albans, Long Island, N. Y., at the meeting of the International College of Surgeons in Chicago.

So far, 59 patients have been discharged from the hospital. Of these, 38 are gainfully employed, and 16 are well and apparently able to work but have been advised not to do so for the present. Another 25, all well with negative sputum, are still in the hospital because of a strict policy of insisting on six months' bed rest after the operation. This method of treatment is for "carefully selected" patients in whom the tuberculosis is confined to a single segment of the lung or in whom the primary focus occupies a segment and no more than one additional adjacent segment is involved.

The method is not a "cure-all" suitable for all types of patients with TB of the lung.

Studies of lung function shows that there is less impairment of function after removal of a segment of lung than when other surgical methods are used for similar cases.

"There is no significant change in function following segmental removal of the diseased portion of the lung," the Navy doctors reported.

Science News Letter, September 13, 1952

Eggs should be stored large-end-up to keep the yolks well-centered.

Here's the easy way to add sound to your films

the new RCA 16mm Magnetic Recorder-Projector

NOW ADD A SPARKLING, new sound track to every 16mm film you use. And do it in minutes—with the new RCA magnetic recorder-projector.

It's the easy, low-cost way to make your films work harder, offer more. With your own sound track on film—old films can tell a new story . . . a general message can be made specific . . . scratched optical sound tracks can be replaced . . . films can speak two languages—one on optical track and the other on magnetic sound track.

With this new RCA projector you can now add sound to your silent films after duplicating on single perforated stock. Or, put a new commentary on your sound films—without impairing your present optical sound track. Add a simple narration, or prepare a complete production in sound.

It's magnificent sound, because it's magnetically recorded sound. And it's just as easy to prepare as a tape recording. To make your own sound track with the RCA magnetic recorder-projector, here's all you do.

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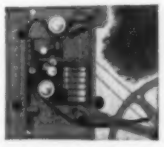
Laboratories are set up to add a narrow magnetic stripe to your films quickly, expertly—for only a few cents a foot. Exposed film or raw stock can be striped. Sixteen- or 24-frame speed can be used. Double-perforated films (films with two sets of sprocket holes) must be duplicated on single-perforation stock.

2. THREAD PROJECTOR AND SET CONTROLS



Thread the RCA projector as you would for a regular showing. Turn knobs to "record" position, thread film over magnetic recording heads and you're ready to record. No extra gadgets to attach. No extra equipment to set up.

3. WATCH PICTURE—SPEAK INTO MICROPHONE

Record your message on film as you watch the picture. Stop . . . erase . . . re-record at any time. You can plan your recording for a single showing—or use it over and over again.

Compare sound reproduction before you buy

Listen to the magnificent sound reproduction from the RCA magnetic recorder projector before you buy any type of sound projector. You've never heard such faithful sound on 16mm film. And RCA's quiet projector mechanism—the famous "thread-easy" mechanism—keeps irritating projector noise out of your recording. For a superb presentation of either optically or magnetically recorded films, listen to the RCA magnetic recorder-projector. Listen . . . compare . . . before you buy.

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Questions

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Photographs: Cover, Northrop Aircraft, Inc.; pp. 163 and 165, Fremont Davis; p. 166, U. S. Coast and Geodetic Survey; p. 167, Army Chemical Center; p. 170, Mount Wilson Observatory.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. books in print, send a remittance to cover retail price (postage will be paid in U. S.) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications from publisher, not from Science Service.

CLAUDE BERNARD AND THE EXPERIMENTAL METHOD IN MEDICINE—J. M. D. Olmsted and E. Harris Olmsted—*Schuman*, 277 p., $4.00. Biography of one of science's greats, who, although he earned his medical degree, never practiced medicine but devoted all his time to experimental physiology. Another volume in the Life of Science Library.

THE COMMON LOON IN MINNESOTA—Sigurd T. Olson and William H. Marshall—*The University of Minnesota Press* (Quetico-Superior Foundation), 76 p., illus., paper, $1.00. A study of the loons in the Knife Lake area shows that they are not plentiful enough to create an economic problem.

CORPORATION GIVING—F. Emerson Andrews —*Russell Sage Foundation*, 361 p., illus., $4.50. This study covers the historical development, present range and legal and tax factors of corporation philanthropy. It also presents data on who benefits and to what extent.

COSTA RICA: A Study in Economic Development—Stacy May, Director, and others—*The Twentieth Century Fund*, 374 p., $3.00. While the national income per capita in Costa Rica is higher than in any other Central American country, with the possible exception of Panama, the cash income per person is about one-tenth of that in the United States.

DETONATION IN CONDENSED EXPLOSIVES—J. Taylor—*Oxford University Press*, 196 p., illus., $5.00. A description of the detonation in those explosives especially used in industry.

ELECTRONICS EVERYWHERE — A. M. Low — *John Day*, 191 p., illus., $2.50. A simplified explanation of electrons, electronics and the applications of this science—from music to atomic research.

HIGH-ENERGY PARTICLES — Bruno Rossi — *Prentice-Hall*, 569 p., illus., $12.50. A book for physicists to provide the researcher in high-energy physics with a report on current problems and formulas, and other tools for his work.

MAN AND EPIDEMICS—C. E. A. Winslow—*Princeton University Press*, 246 p., illus., $4.00. A survey of the methods and results of the science of public health in controlling disease.

MODERN ELEMENTARY STATISTICS — John E. Freund—*Prentice-Hall*, 418 p., illus., $7.35. A course introducing the fundamentals of statistical methods to students in the social and natural sciences, dealing with the concepts and problems of inductive statistics.

NEWSREELS ACROSS THE WORLD—Peter Baechlin and Maurice Muller-Strauss—*UNESCO* (Internation Documents Service), 100 p., illus., paper, $2.00. A world survey of news films, including the problems arising from production to projection.

THE PERSONNEL OF STATE DEPARTMENTS OF EDUCATION—Fred F. Beach and Andrew H. Gibbs—*Govt. Printing Office*, 46 p., paper, 30 cents. Personnel requirements and ways to improve recruiting, selecting and training.

PHYSICS AND MEDICINE OF THE UPPER ATMOSPHERE: A Study of the Aeropause—Clayton S. White and Otis O. Benson, Jr., Ed's.—*The University of New Mexico Press*, 611 p., $10.00. Contributions of 34 scientists include data on astrophysics, aeronautical engineering, radiobiology and aviation medicine.

QUEST FOR A SUSPECTED INDUSTRIAL CARCINOGEN—Carrol S. Weil, Henry F. Smyth, Jr. and Thomas W. Nale—*Mellon Institute*, 13 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

SEMANTICS AND THE PHILOSOPHY OF LANGUAGE —Leonard Linsky, Ed. — *University of Illinois Press*, 289 p., $3.75. Selected essays, varying in technical level, for college use.

YOUR TELEPHONE AND HOW IT WORKS—Herman and Nina Schneider—*McGraw-Hill*, 96 p., illus., $2.00. Covers battery, dial and coin telephones, as well as a general explanation of how the telephone works. For children.

Science News Letter, September 13, 1952

• RADIO

Saturday, Sept. 20, 3:15-3:30 p.m., EDT

"Adventures in Science," with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. I. S. Ravdin, professor at the University of Pennsylvania Medical School, Philadelphia, discusses "Advances in Surgery."

Due to football season, next Adventures in Science broadcast will be Saturday, Dec. 13.

ASTRONOMY

19-Day September

➤ "THIRTY DAYS hath September . . ." begins the old calendar rhyme, but 200 years ago, September had only 19 days for people in America and England.

Thursday, Sept. 14, followed immediately after Wednesday, Sept. 2, in the year 1752. Many people felt they had been robbed of 11 days, and riots resulted. "Give us back our fortnight!" was a familiar cry.

The cause of this peculiar short month was the introduction of the Gregorian calendar, adopted two centuries previously in many Catholic countries, into England and the American colonies.

The Julian calendar, used by many countries at the time, was not based upon an exact enough estimate of the length of the tropical year. As a result, the vernal equinox, which occurred on March 21 at the time of the Council of Nicaea in 325 A.D., began arriving earlier and earlier. By 1582, it fell on March 11.

The sun is responsible for all the trouble man has experienced throughout the ages in trying to develop a reliable calendar. Instead of completing its apparent trip among the stars in an even number of days or hours, the sun takes 365 days, five hours, 48 minutes and 46 seconds to return to an equinox.

To make a more exact calendar, Pope Gregory XIII, upon the advice of the astronomer Clavius, in 1582 ordered the calendar corrected by dropping 10 days. In France, Spain and other Catholic countries, the day following Oct. 4, 1582, was called the 15th instead of the fifth.

To avoid further displacement of the beginning of spring, Gregory decreed that the rule of adding an extra day every fourth year should be followed except in the case of those century years whose number is not divisible by 400. Thus 2000 A.D. will be a leap year, but 2100 will not, nor was 1900.

The new-type calendar was not adopted in England and her colonies until the 18th century. By that time, 11 days had to be dropped to bring the calendar in line. The new calendar was recognized in China and Russia early this century, at which time the two calendars differed by 13 days.

Science News Letter, September 13, 1952

Do You Know?

Accidents kill more young children than does any single disease.

Hawks apparently have the sharpest *vision* of all creatures.

In general, human *births* are most frequent in August or September; they are less frequent in April or May.

Stream *pollution*, a long-time problem in an Ohio area, was stopped in six days after the state brought suit against the companies responsible.

Prestressed *concrete* beams are "squeezed" together at their lower sides by taut wires or rods to counteract stretching forces when heavy loads move over them.

Eyestrain from too much reading or close work partly is due to prolonged contraction of the ciliary muscle; the muscle makes the eye lens more convex when objects near the person are being viewed.

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C., and ask for Gadget Bulletin 639. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription

PRE-FABRICATED KNOTTY-PINE room interiors are made to order from plans supplied by architects or homeowners. The interiors come complete with facing for doors, windows, closets and decorative trim necessary "to do the job." Numbered pieces help the buyer to install the interior himself.

Science News Letter, September 13, 1952

PRE-PAINT AUTO cleaner "shampoos" the metal before spray painting is begun. The solvent removes films of silicon polish and wax as well as particles of grit and dust, leaving the body ready to be sanded, washed and painted.

Science News Letter, September 13, 1952

VALVE SHIELDS that fit snugly over joints in valves protect personnel from being sprayed by acid and other hazardous chemicals should packing in the valves fail. Made of a synthetic rubber that resists chemical deterioration, the shields have a flowerpot design and are easily installed.

Science News Letter, September 13, 1952

FISHING ROD made of stainless steel, as shown in the photograph, is small enough to be carried in the pocket of a sport jacket. Measuring only 16½ inches from tip to handle, the rod has a sort of pistol-

like grip, and has ½-inch holes perforated in the handle. A slot directly under the reel can be used as a bottle opener.

Science News Letter, September 13, 1952

ALUMINUM STORM window that doubles as a window screen in the summer is quickly installed, even on out-of-true windows, and requires no protruding tacks or channels. Its screen or storm sash can be stored in the upper part of the window when not in use.

Science News Letter, September 13, 1952

CANDLE LAMP with a flame "carburetor" keeps candles from dripping and lengthens their burning lives. The candle is enclosed in a special holder having a cap that fits over the candle tip. A small wire encircles the wick, regulating combustion and concentrating the flame's heat there. As it burns, the candle is pushed up in the holder by a spring.

Science News Letter, September 13, 1952

SAW SET contains a carved handle of natural hardwood and five blades. Bolted into the handle with a rust-resisting wing nut, the blades include a 16-inch panel saw, a 12-inch mitre back saw, a 15-inch pruning saw, a 12-inch compass saw and a 10-inch keyhole saw.

Science News Letter, September 13, 1952

SPONGE-RUBBER PAD for hunters protects shoulders from painful gouges due to rifle recoil. Enclosed in a cloth pouch, the pad can be buttoned into a hunting coat or shirt, or fastened in with safety pins.

Science News Letter, September 13, 1952

• Nature Ramblings •

➤ BEARS ARE beginning to go into winter quarters now up in Canada, and at the higher altitudes of their range in our own Rockies.

At lower latitudes and altitudes they will remain active for a few weeks longer, but by the time snow flies they all will have retired for the winter. Only in the hammocks and canebrakes of the Gulf Coast region are you likely to find bears on the prowl the year round.

This long winter drowse of the bears is usually called hibernation. Actually, however, it is not true hibernation. True hibernation, such as is found in ground squirrels and marmots, is a state of death-like sleep, wherein the animal's breath and pulse almost stop and its temperature drops to a point very little above that of its environment.

An animal in this state is exceedingly difficult to arouse: pinch it, poke it, even stick pins in it, and it just continues to lie limp as the proverbial dishrag.

Bedtime for Bears

A bear in its winter sleep it quite different. It breathes at about the normal rate for any sleeping animal and its body temperature remains high enough to melt snow that may sift down on its fur.

It is not particularly difficult to arouse, and it may even wake up of its own accord and emerge for a shorter or longer period. This kind of winter sleep should be called dormancy rather than hibernation.

Bears retire for the winter before winter really sets in—they may be found settled down for their long sleep while the weather is still rather mild and there is plenty of food available in the woods.

Invariably, bears "going to roost" before cold weather comes are very fat. The winter-prowlers are very likely to be animals that did not succeed in putting enough fat on their ribs to induce a tendency to become dormant.

There is an internal index to this physiological drowsiness. In dressing fat bears killed at the beginning of winter, the stomach has been found empty and contracted into a tight, hard knot, into which it would be impossible to get any more food.

Apparently when the bear reaches a certain state of fatness it just becomes unable to eat anything more, so all there is left to do is sleep.

Science News Letter, September 13, 1952